



EnSafe Inc.

ENVIRONMENTAL AND MANAGEMENT CONSULTANTS

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November 15, 2000

**Florida Department of Environmental Protection**

**Attn: Joe Fugitt**

**Twin Towers Office Building**

**2600 Blair Stone Road**

**Tallahassee, Florida 32399-2400**

**Re: Response to Comments, Final Record of Decision,  
Operable Unit 6 (Sites 9 and 29), NAS Pensacola  
Contract # N62467-89-D-0318/083**

**Dear Mr. Fugitt:**

On behalf of the Navy, EnSafe Inc. is pleased to submit two copies of the response to FDEP comments and Manganese Hazard Index Recalculation Memorandum. In addition, errata pages are also enclosed for the Operable Unit 6 Final Record of Decision. Please replace the existing pages with the pages attached.

If you should have any questions or need any additional information regarding the document, please do not hesitate to call me.

Sincerely,

EnSafe Inc.

A handwritten signature in cursive script that reads "Allison L. Harris".

Allison L. Harris

Task Order Manager

Enclosure

cc: Charlie Goodard, FDEP - NW District without enclosure  
Bill Hill, Code 1851 SOUTHNAVFACENGCOM without enclosure  
EnSafe Inc. file without enclosure  
EnSafe Inc. Knoxville file without enclosure  
EnSafe Inc. library without enclosure  
Administrative Record

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
RESPONSE TO COMMENTS  
FINAL RECORD OF DECISION  
OPERABLE UNIT 6  
NAS PENSACOLA**

**Comment 1:**

Groundwater at the sites **exceeds** the secondary Drinking Water Standard for manganese. Therefore, further monitoring **and/or** institutional controls to restrict **groundwater usage** may **be** required. Prior to implementation of groundwater restrictions, additional groundwater **data** should be **presented** to define the area of the manganese **exceedence** and/or establish **that the** elevated manganese concentrations are not **site** related.

It is probable **that** the area of manganese **exceedence** **extends** beyond the **site boundary** and encompasses a portion of the former Chevalier Field area. The occurrence of manganese is also suspected to the **nature** of the fill attributable to the site.

Existing groundwater data (manganese concentrations and turbidity) collected for **CERCLA** sites in the Chevalier **Field area** may be utilized to evaluate **the occurrence** of manganese and **demonstrate** if manganese is endemic to **this area** of the facility and attributed to **turbidity**.

**Attached** to this **letter** is groundwater statistical information retrieved from the ambient groundwater monitoring network for Escambia County. This **data** indicates that several groundwater monitoring wells in the groundwater monitoring **network exhibited elevated** manganese concentrations **attributed to suspended** particulates in **the groundwater samples**.

I recommend **that the** Navy consider **expanding the** facility groundwater background data in order to **establish** more **representative** reference **data** for **the** facility.

**Response:**

The attached figure presents manganese detected concentrations in the Chevalier Field area, The distribution of these detections suggests a widespread occurrence of manganese above the secondary DWS across the eastern portion of the facility and that the detections at OU 6 should not be specifically associated with site activities (i.e., it is not site-related),

**Comment 2:**

The ROD states that the hazard indices (HIs) were found to be 9 and 4 for the future **child** resident and 4 and 2 for the **adult** at Sites 9 and 29 (page 41). The ROD also states that the primary contributor to **hazard** at the sites is **manganese**, The basis of these HIs and the hazard based RGOs (table 6-6 and 6-7) should **be** reevaluated.

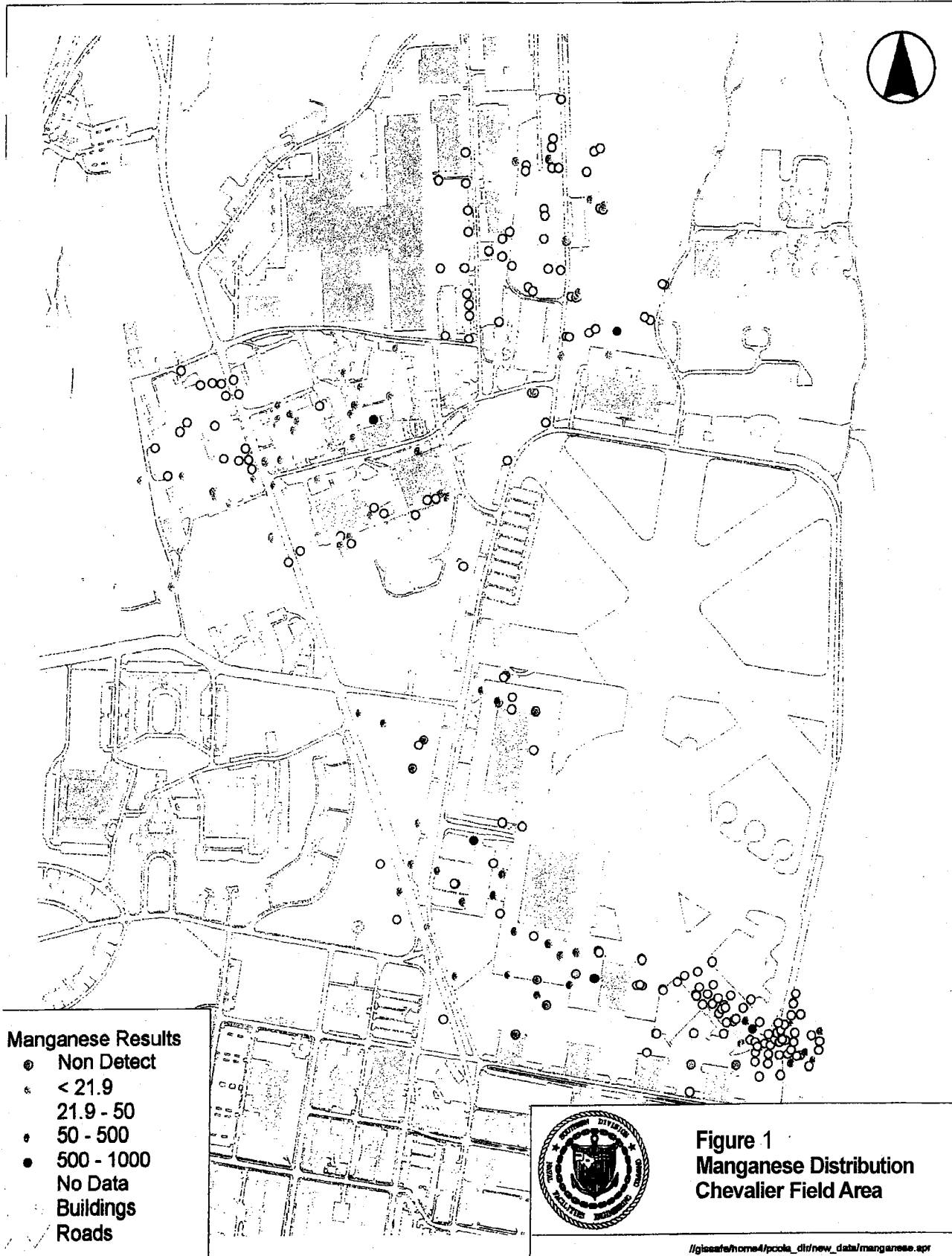
**Attached** is a memorandum from the University of Florida dated November 30, 1999 that develops

health-based groundwater cleanup target levels for many contaminants having organoleptic criteria or secondary standards. The health-based criteria for manganese is stated to be  $980 \mu\text{g/L}$  in this memorandum. Groundwater samples collected at OU6 exhibited manganese concentrations below the health-based criteria.

**Response:**

The HIs and RGOs have been recalculated as presented in the attached memorandum. Using the current oral Rfd, the risk is primarily driven by arsenic, which was detected at concentrations below its Primary Drinking Water Standard and Maximum Contaminant Level of 50 ppb. In addition, as stated in the response to comment 1, distribution data suggest that the manganese detections are not site-related. Therefore, no further action is appropriate for OU 6 groundwater. This comment was addressed at the following locations in the document:

Table 6-5	page 40	Revised Oral Reference Dose
Table 6-6	page 43	Revised RGO for manganese at Site 9
Table 6-7	page 44	Revised RGO for manganese at Site 29
Paragraph 2 of page 41		Revised Hazard Indices for Sites 9 and 29
Paragraph 1 of page 42		Revised statement regarding manganese RGO
Paragraph 1 of page 45		Included conclusion statement regarding manganese detections



## **Evaluation of Updated Manganese Oral Rfd Values on Noncarcinogenic Risk Estimates at NAS Pensacola OU 6 (Sites 9 and 29) and Site 34**

### **Objectives**

In a letter dated June 9, 2000 from Joseph F. Fugitt of the Florida Department of Environmental Protection to Mr. Bill Hill of the Naval Facilities Engineering Command, it is stated that the basis of the hazard indices (HIs) and remedial goal options (RGOs) for manganese should be reevaluated. At the time of the original Human Health Risk Assessment (HHRA), the oral RfD (reference dose) for manganese was 0.005 mg/kg-day. Since then an updated, and less toxic, value of 0.14 mg/kg-day has been published in the U.S. EPA's Integrated Risk Information System (IRIS) database. Use of this current oral RfD substantially reduces the hazard quotients (HQs) and cumulative noncarcinogenic risk estimates (HI) due to manganese at NAS Pensacola OU6 sites. Similarly, the less toxic oral RfD value should result in higher calculated RGOs.

### **Methodology**

#### *Risk Calculations*

HQs are calculated using the equation:  $HQ = CDI/RfD$ . The HI is the sum of HQs for a particular exposure scenario. Because manganese is not classified as a carcinogen, there is no carcinogenic toxicity value for manganese and estimates of carcinogenic risk at OU 6 sites are unaffected by updates to toxicity reference values for manganese. Only those compounds which contribute to site HIs are shown in Table 1.

#### *Remedial Goal Options*

Remedial goal options (RGOs) are calculated using the following equation:

$$RGO = EPC \times \text{Target Risk} / \text{Calculated Risk}$$

Where: EPC = exposure point concentration, Target Risk = 0.1, 1, or 10, and Calculated Risk = the noncarcinogenic risk (HQ) calculated for the chemical in question (manganese). RGOs based on noncarcinogenic risk are only calculated for the future residential child scenario. Only RGOs for manganese are shown in Table 2.

### **Results**

#### *Risk Calculations*

Table 1 presents the results of recalculating HQs and HIs using the updated oral RfD for manganese. In the original HHRA, HIs for groundwater ingestion exceeded 1 for both the future residential adult and future residential child scenarios at all sites within OU6 (Sites 9 and 29) and Site 34. The risk was driven primarily by concentrations of manganese in groundwater. In the updated HHRA, HIs exceed 1 only for the residential child scenario at Sites 9 and 34, and have been reduced at Site 9 from an HI = 9 to an HI = 2 for the residential child, and at Site 34 from an HI = 8 to an HI = 2 for the residential child. In the current HHRA, at Sites 9 and 34 where the HIs exceed 1 for the residential child scenario, risk is being driven primarily by arsenic.

**Remedial Goal Options**

Table 2 presents the results of recalculating RGOs based on the updated noncarcinogenic risk (HQ) values for manganese.

**TABLE 1**  
**COMPARISON OF NONCARCINOGENIC RISK VALUES**  
**INGESTION OF CHEMICALS IN GROUNDWATER**  
**NAS PENSACOLA OU 6**

**SITE 9**

Compound	CDI	RfD		HQ	
		Original	Current	Original	Current
Arsenic	1.34E-04	3.0E-04	3.0E-04	0.45	0.45
Manganese	1.66E-02	5.0E-03	1.4E-01	3.32	0.12
				HI	3.77
					0.57
<b>CHILD</b>					
Arsenic	3.13E-04	3.0E-04	3.0E-04	1.04	1.04
Manganese	3.87E-02	5.0E-03	1.4E-01	7.74	0.28
				HI	8.78
					2.45

**SITE 29**

Compound	CDI	RfD		HQ	
		Original	Current	Original	Current
ADULT					
Cyanide	6.79E-03	2.0E-02	2.0E-02	0.34	0.34
Dieldrin	1.27E-06	5.0E-05	5.0E-05	0.03	0.03
Manganese	7.40E-03	5.0E-03	1.4E-01	1.48	0.05
				HI	1.84
					0.42
CHILD					
Cyanide	1.59E-02	2.0E-02	2.0E-02	0.80	0.80
Dieldrin	2.96E-06	5.0E-05	5.0E-05	0.06	0.06
Manganese	1.73E-02	5.0E-03	1.4E-01	3.46	0.12
				HI	4.31
					0.98

**SITE 34**

Compound	CDI	RfD		HQ	
		Original	Current	Original	Current
ADULT					
Arsenic	1.18E-04	3.0E-04	3.0E-04	0.39	0.39
Cadmium	1.21E-04	5.0E-04	5.0E-04	0.24	0.24
Manganese	1.30E-02	5.0E-03	1.4E-01	2.60	0.09
Naphthalene	8.77E-03	4.0E-02	4.0E-02	0.22	0.22
				HI	3.45
					0.95
CHILD					
Arsenic	2.75E-04	3.0E-04	3.0E-04	0.92	0.92
Cadmium	2.81E-04	5.0E-04	5.0E-04	0.56	0.56
Manganese	3.04E-02	5.0E-03	1.4E-01	6.08	0.22
Naphthalene	2.05E-02	4.0E-02	4.0E-02	0.51	0.51
				HI	8.07
					2.21

CDI Chronic daily intake

RfD Reference dose

HQ Hazard Quotient

HI Hazard Index

**Table 2**  
**Remedial Goal Options — Groundwater**  
**OU 6 (Sites 9, 29, 34)**  
**Pensacola Naval Air Station - Pensacola, Florida**

			Remedial Goal Options (mg/L)							
			Target Risk							
			Noncarcinogenic Risk (HQ)		0.1		1		10	
Site	Parameter	EPC (mg/L)	Original	Current	Original	Current	Original	Current	Original	Current
Site 9	Manganese	0.605	7.7	0.28	0.0078	0.22	0.078	2	0.78	22
Site 29	Manganese	0.270	3.5	0.12	0.0078	0.23	0.078	2	0.78	23
Site 34	Manganese	0.475	6.1	0.22	0.0078	0.22	0.078	2	0.78	22

**Notes:**

EPC            exposure point concentration  
mg/L           milligrams per liter